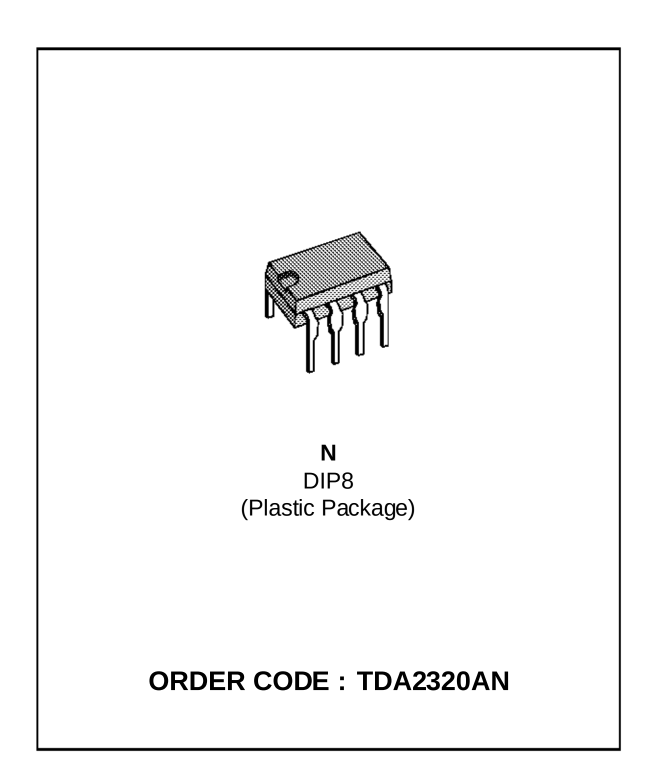


TDA2320A

STEREO AMPLIFIER

- WIDE SUPPLY VOLTAGE RANGE (3 to 36V)
- SINGLE OR SPLIT SUPPLY OPERATION
- VERY LOW CURRENT CONSUMPTION (0.8mA)
- VERY LOW DISTORTION
- NO POP-NOISE



N
DIP8
(Plastic Package)

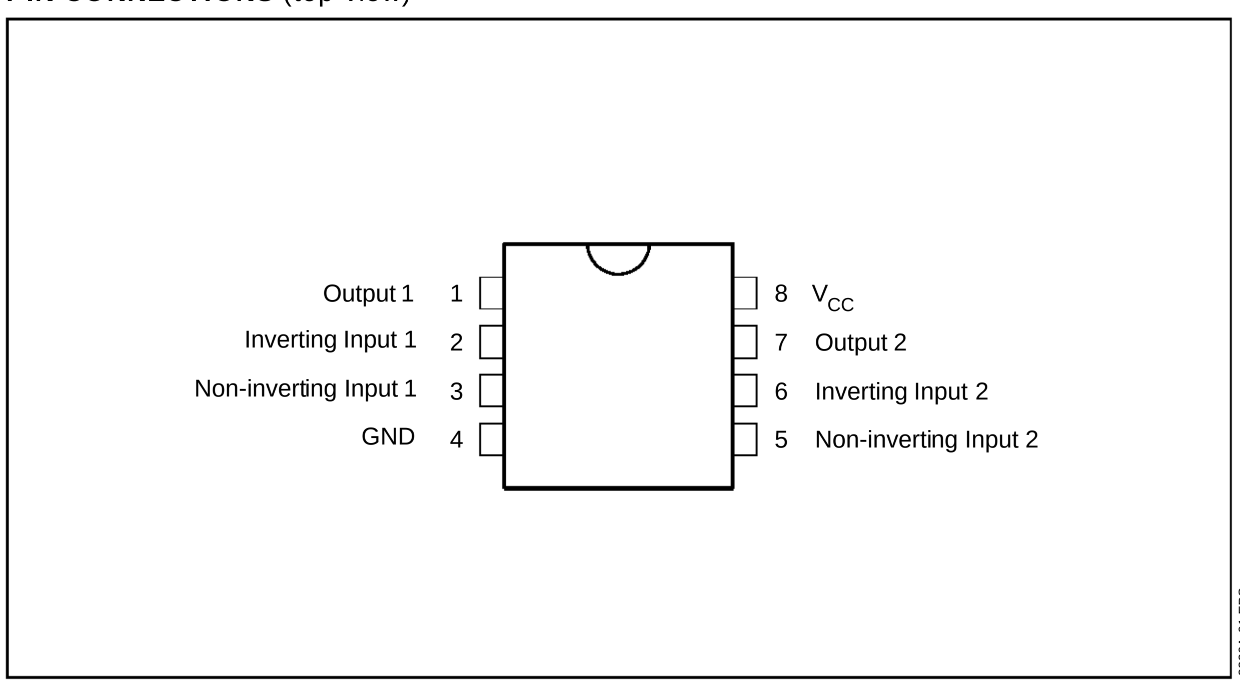
ORDER CODE : TDA2320AN

DESCRIPTION

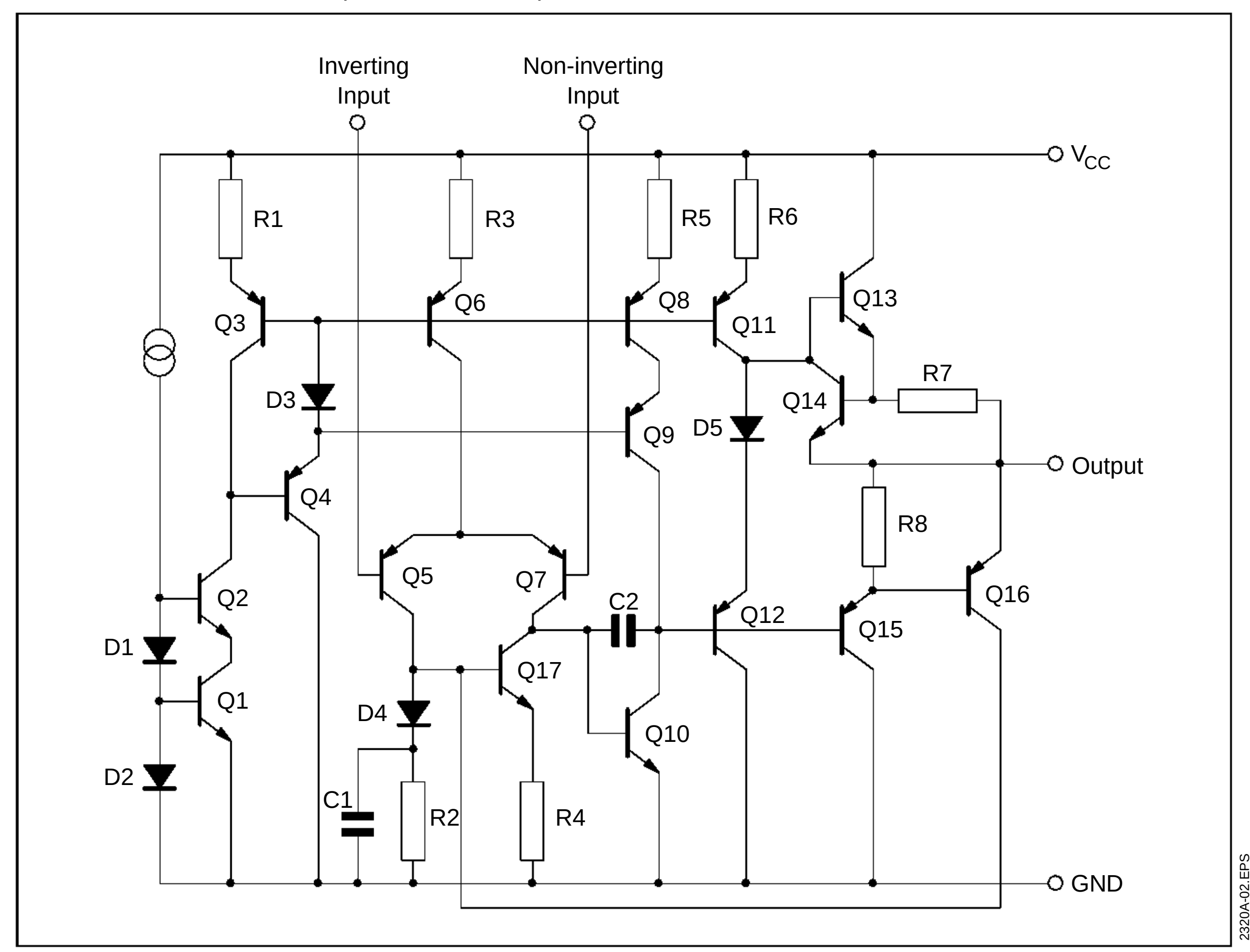
The TDA2320A is a stereo class A preamplifier intended for application in portable cassette players and high quality audio systems.

The TDA2320A is a monolithic integrated circuit in a 8 lead plastic dip.

PIN CONNECTIONS (top view)



SCHEMATIC DIAGRAM (1/2 TDA2320A)



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	36	V
P_{tot}	Total Power Dissipation at T_{amb} = 70°C	400	mW
T_{stg}, T_j	Storage and Junction Temperature	–40 to 150	°C

2320A-01.TBL

ELECTRICAL CHARACTERISTICS
V_{CC} = 15V, T_{amb} = 25°C (unless otherwise specified) (refer to the test circuits)

Symbol	Parameter		Min.	Typ.	Max.	Unit
V_{CC}	Supply Voltage (*)		3		36	V
I_{CC}	Supply Current (*)			0.8	2	mA
I_{ib}	Input Bias Current			150	500	nA
V_{io}	Input Offset Voltage $R_s \leq 10k\Omega$			1	5	mV
I_{io}	Input Offset Current			10	50	nA
A_{vd}	Open Loop Voltage Gain V_{CC} = 15V V_{CC} = 4.5V	 f = 333Hz f = 1kHz f = 10kHz f = 1kHz		 80 70 50 70		dB
V_{OPP}	Output Voltage Swing (f = 1kHz, R_L = 600Ω) (*)	 V_{CC} = 15V V_{CC} = 4.5V		 13 2.5		V
GBP	Gain-bandwidth Product f = 20kHz		1.5	2.5		MHz
FBP	Power Bandwidth (*) V_o = 5V_{PP}, THD = 1%		40	70		kHz
SR	Slew Rate (*)		1	1.6		V/µs
THD	Distortion (V_o = 2V, A_V = 20dB) (*)	 f = 1kHz f = 10kHz		 0.03 0.08		%
e_n	Equivalent Input Noise Voltage (**) Curve A B = 22Hz to 22kHz f = 1kHz	 R_s = 50Ω R_s = 600Ω R_s = 5kΩ R_s = 50Ω R_s = 600Ω R_s = 5kΩ R_s = 600Ω		 1 1.1 1.5 1.3 1.5 2 9	 1.4	µV nV/√Hz
V_{O1}/V_{O2}	Channel Separation (**) f = 1kHz			100		dB
SVR	Supply Voltage Rejection Ratio(**) f = 100Hz			80		dB

2320A-02.TBL

(*) Test circuit of figure 1
(**) Test circuit of figure 2

TYPICAL APPLICATION

STEREO PREAMPLIFIER FOR CASSETTE PLAYERS

2320A-03.EPS

TEST CIRCUITS

Figure 1

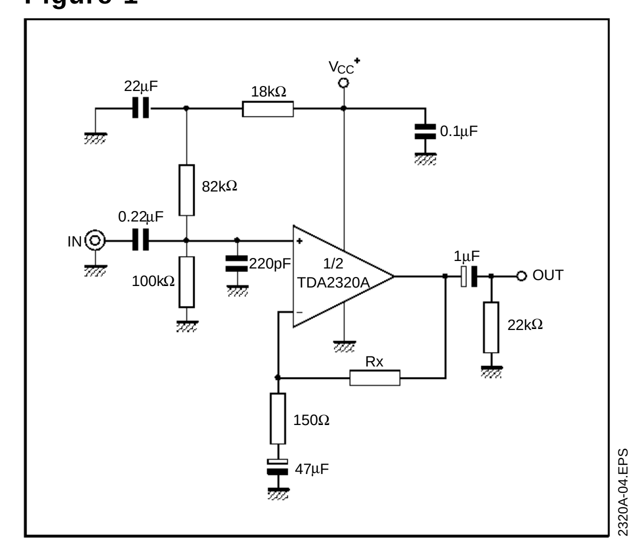


Figure 2

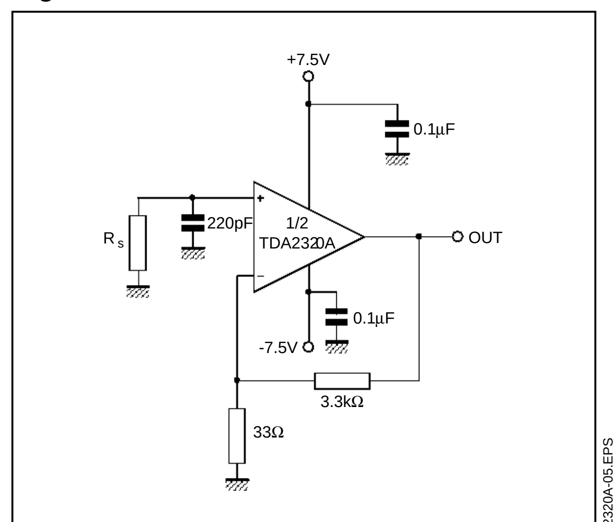


Figure 3 : Supply Current versus Supply Voltage

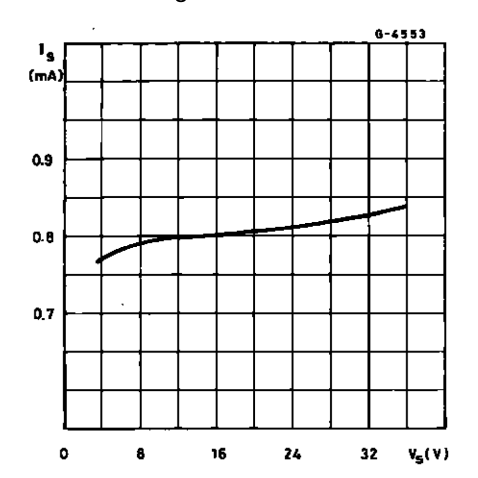


Figure 4 : Supply Current versus Ambient Temperature

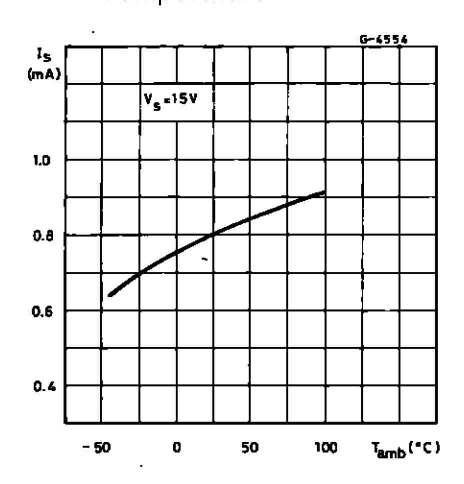


Figure 5 : Output Voltage Swing versus Load Resistance

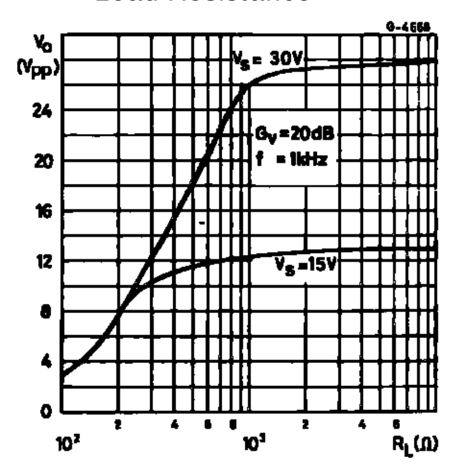


Figure 6 : Power Bandwidth

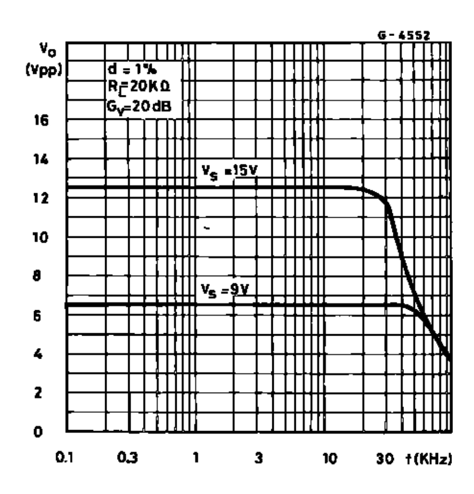


Figure 7 : Total Harmonic Distortion versusOutput Voltage

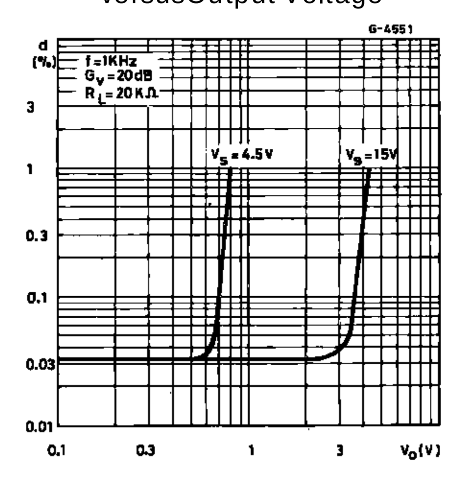


Figure 8 : Total Input Noise versus Source Resistance

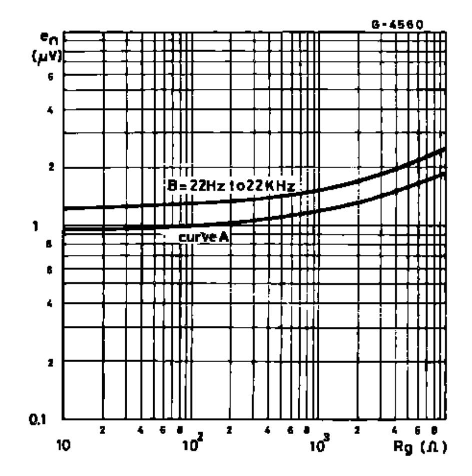


Figure 9 : Noise Density versus Frequency

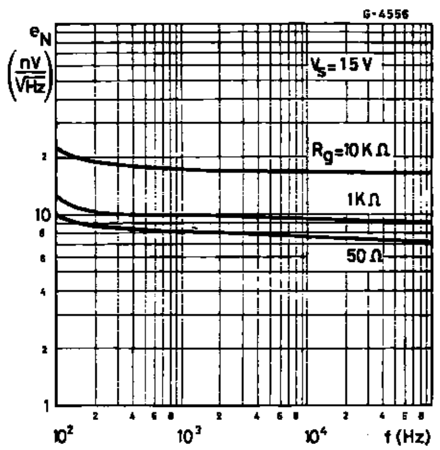


Figure 10 : RIAA Preamplifier Response

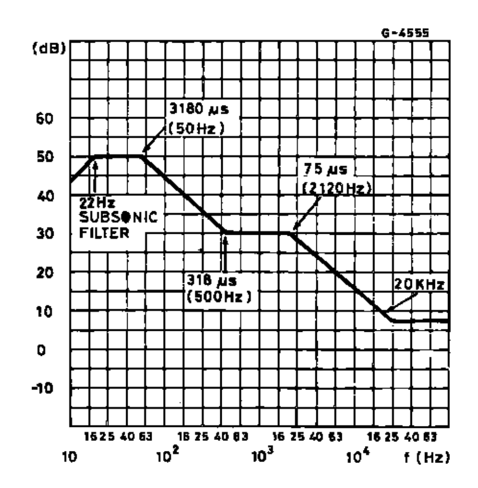
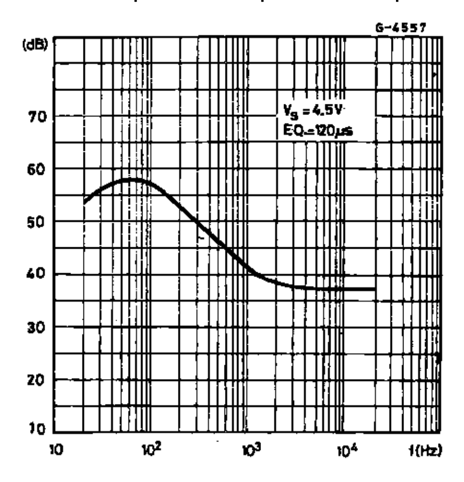


Figure 11 : Tape Preamplifier Frequency



APPLICATION INFORMATION

Figure 12 : Stereo RIAA Preamplifier

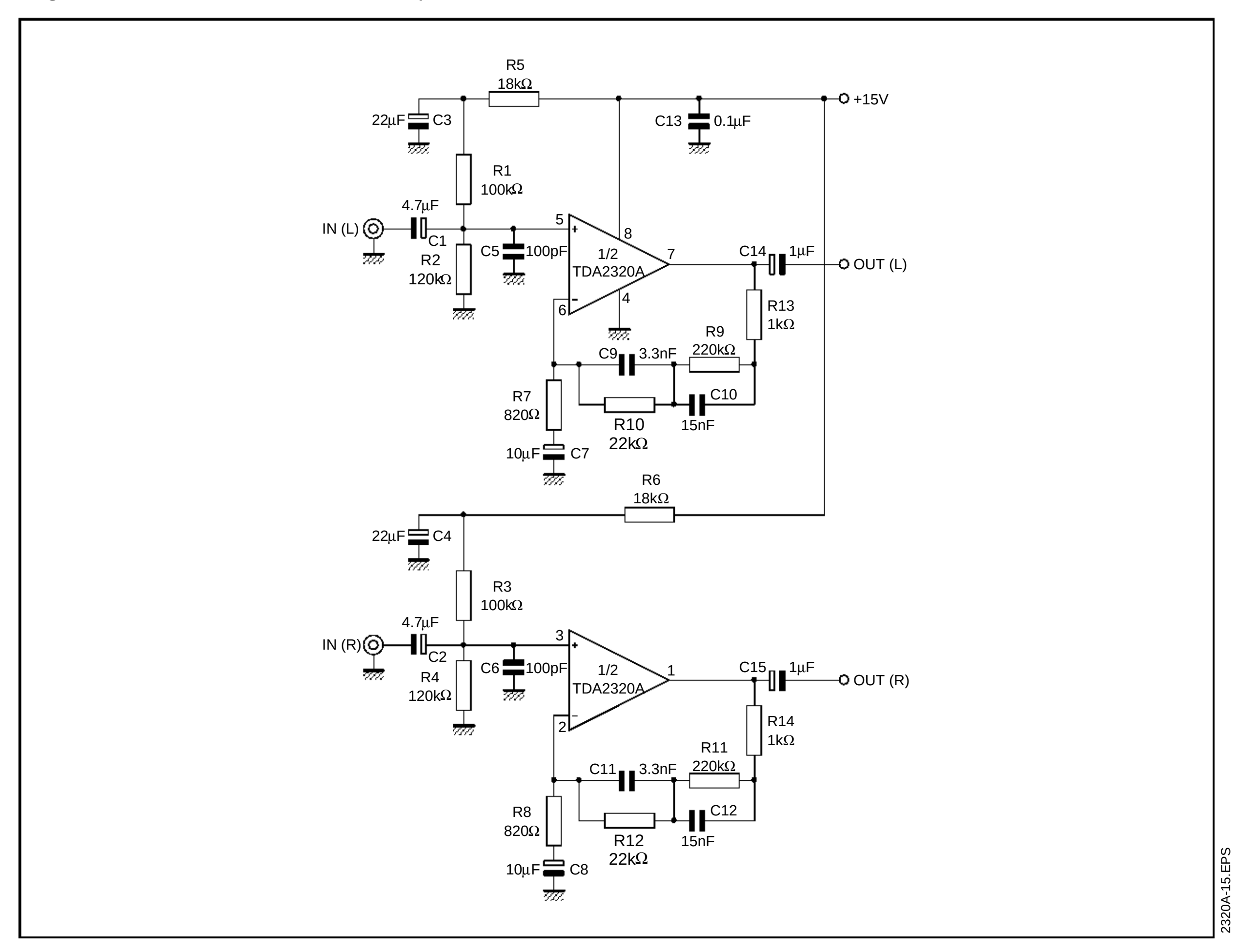


Figure 13 : P.C. Board and Components layout of the Circuit of figure 12

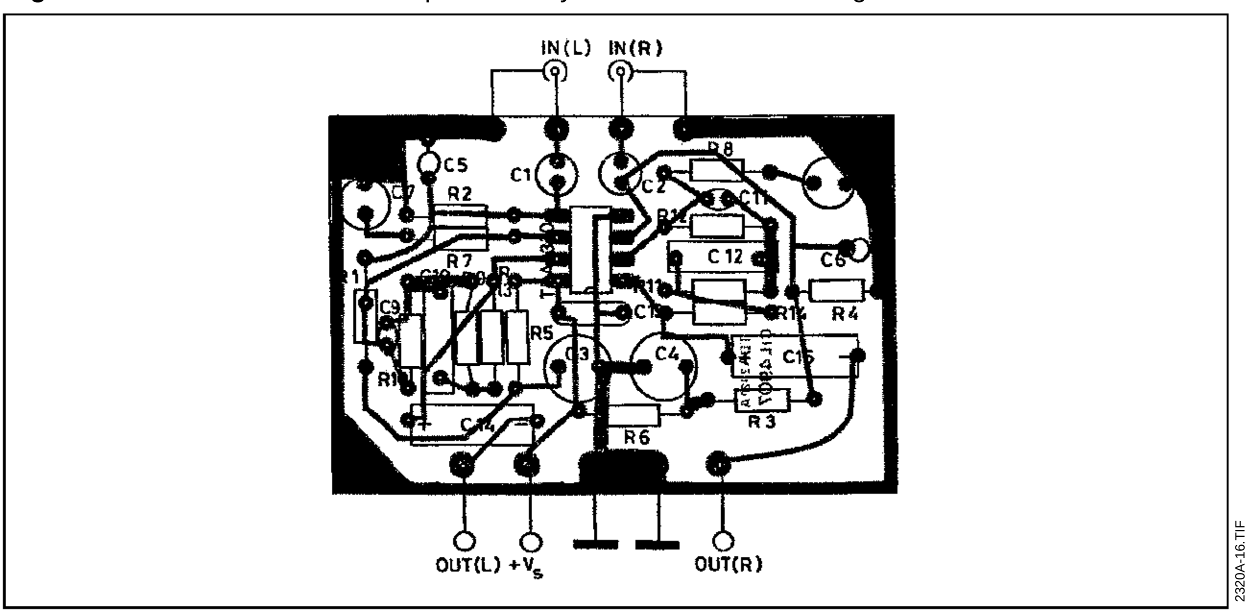


Figure 14 : Second Order 2kHz Butterworth Crossover Filter for Hi-Fi Active Boxes

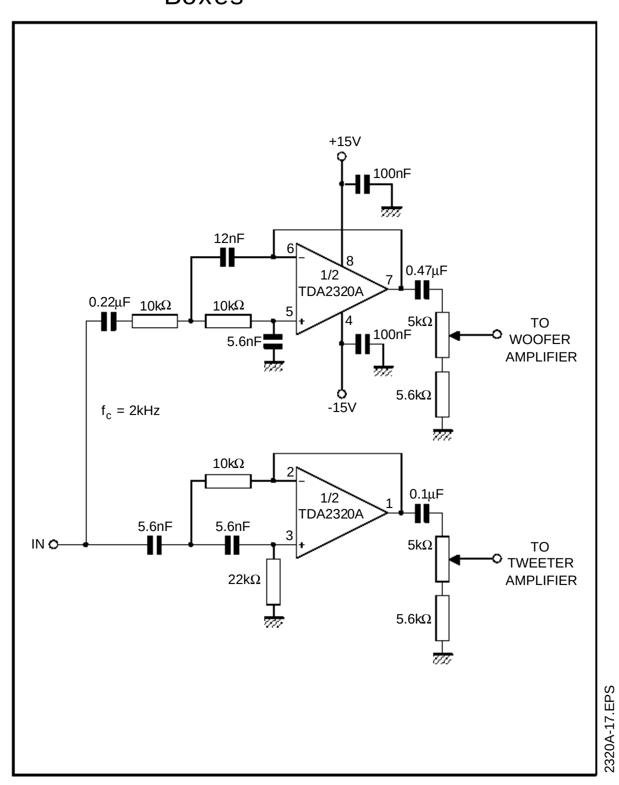


Figure 15 : Third Order 2.8kHz Bessel Crossover Filter for Hi-Fi Actives Boxes

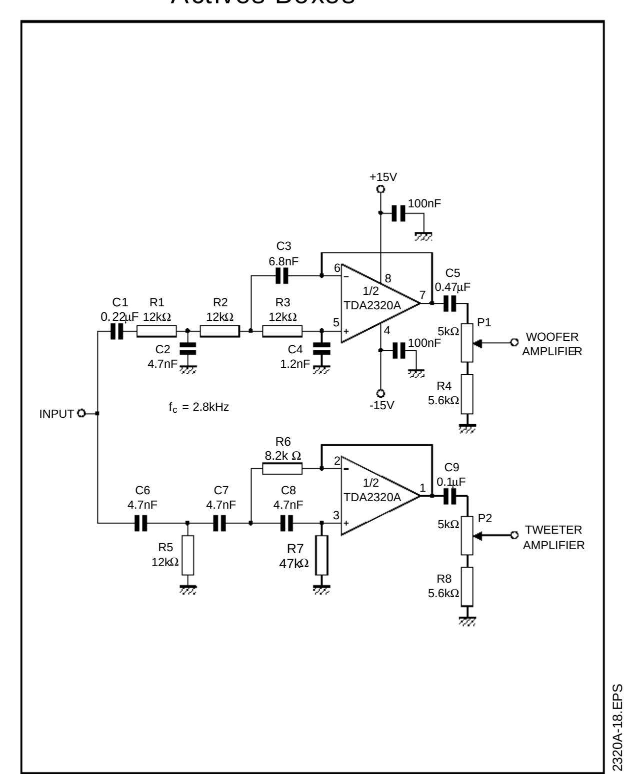


Figure 16 : Frequency Response (circuit of figure 14)

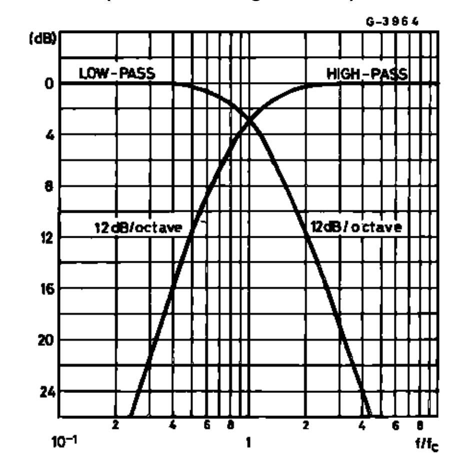


Figure 17 : Frequency Response (circuit of figure 15)

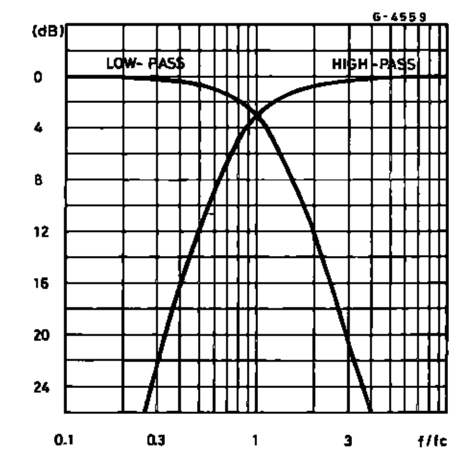


Figure 18 : 200Hz to 2kHz Active Bandpass Filter for Midrange Speakers

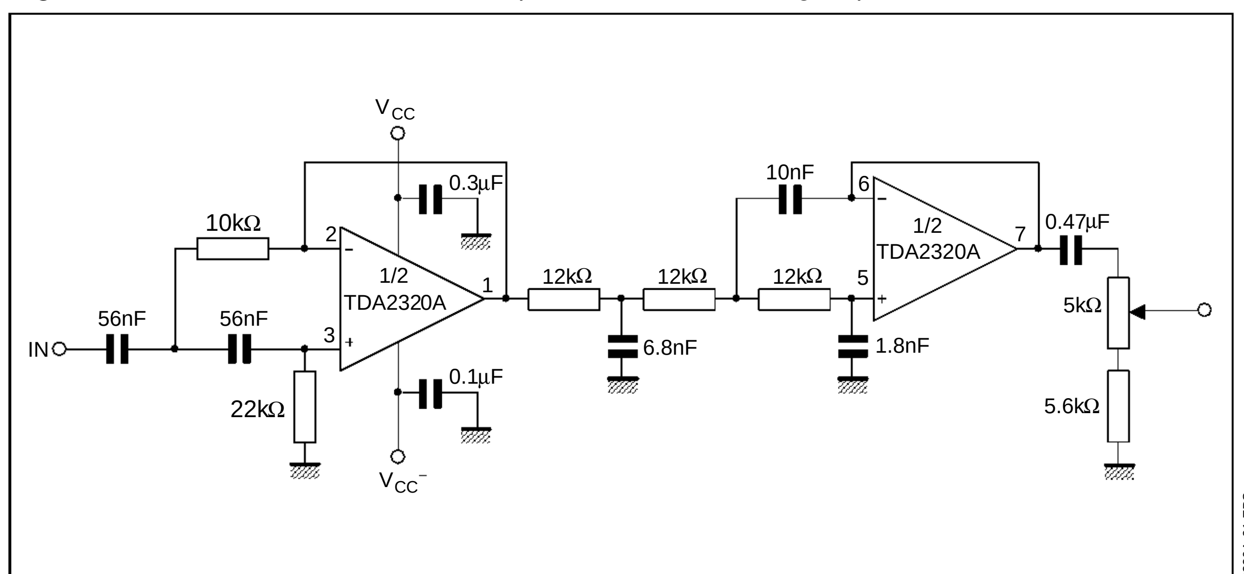
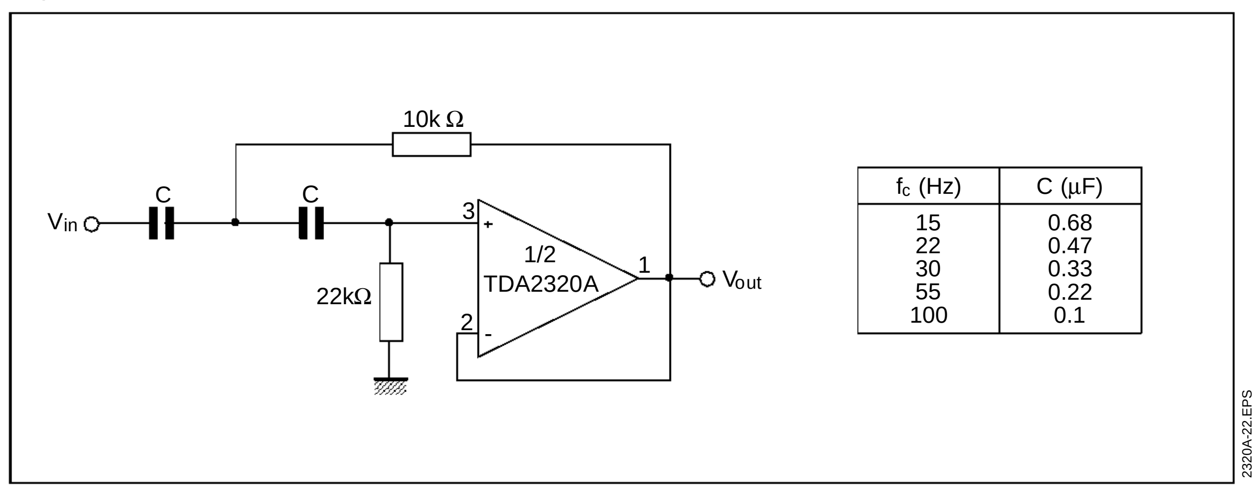


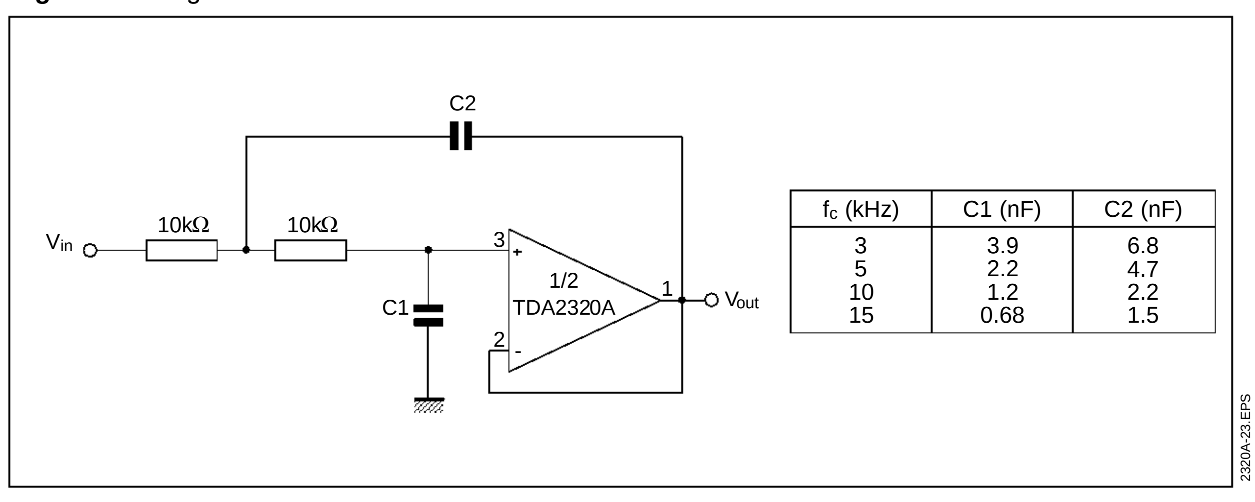


Figure 19 : Subsonic Filter



f_c (Hz)	C (µF)
15	0.68
22	0.47
30	0.33
55	0.22
100	0.1

Figure 20 : High-cut Filter



f_c (kHz)	C1 (nF)	C2 (nF)
3	3.9	6.8
5	2.2	4.7
10	1.2	2.2
15	0.68	1.5

Figure 21 : Fifth Order 3.4kHz Low-pass Butterworth Filter

1st order 2nd order 3rd order

2320A-24.EPS

For f_c = 3.4kHz and R_i = R1 = R2 = R3 = R4 = 10kΩ, we obtain :

$$C1 = 1.354 \cdot \frac{1}{R} \cdot \frac{1}{2\Pi f_c} = 6.33nF$$

$$C1 = 0.421 \cdot \frac{1}{R} \cdot \frac{1}{2\Pi f_c} = 1.97nF$$

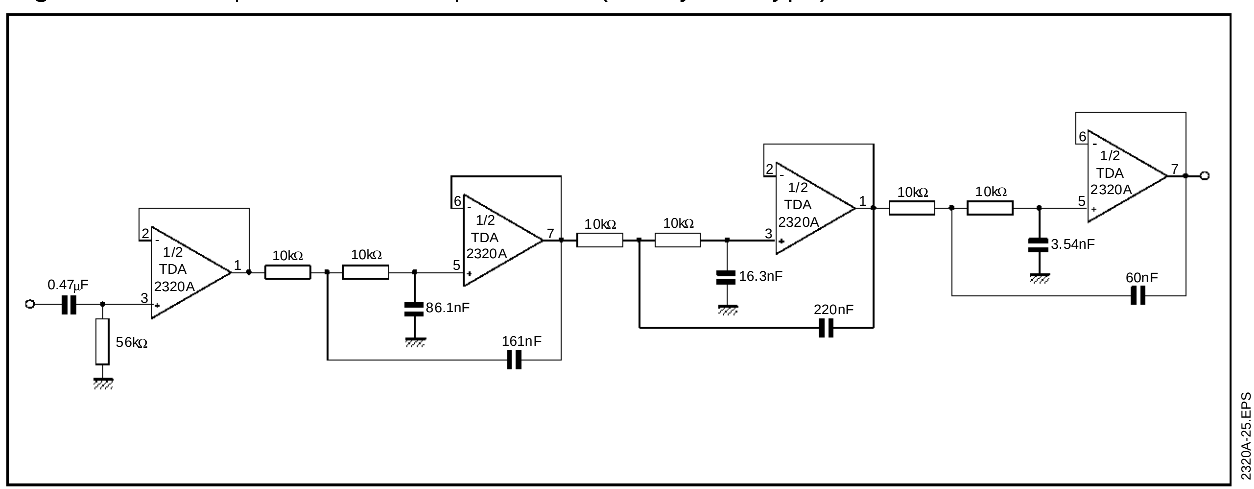
$$C2 = 1.753 \cdot \frac{1}{R} \cdot \frac{1}{2\Pi f_c} = 8.20nF$$

$$C3 = 0.309 \cdot \frac{1}{R} \cdot \frac{1}{2\Pi f_c} = 1.45nF$$

$$C4 = 3.325 \cdot \frac{1}{R} \cdot \frac{1}{2\Pi f_c} = 15.14nF$$

The attenuation of the filter is 30dB at 6.8kHz and better than 60dB at 15kHz.

Figure 22 : Sixth-pole 355Hz Low-pass Filter (Chebychev type)



This is a 6-pole Chebychev type with ±0.25dB ripple in the passband. A decoupling stage is used to avoid the influence of the input impedance of the filter's characteristics.

The attenuation is about 55dB at 710Hz and reaches 80dB at 1065Hz. The in band attenuation is limited in practice to the ±0.25dB ripple and does not exceed 1/2dB at $0.9f_c$.

Figure 23 : Three Band Tone Control

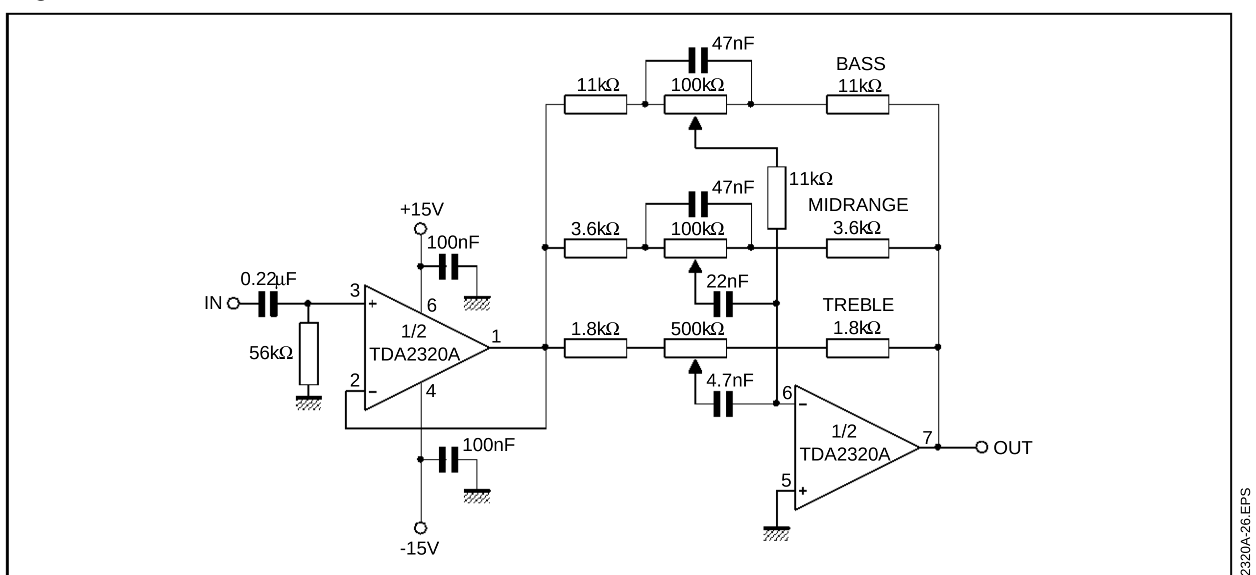
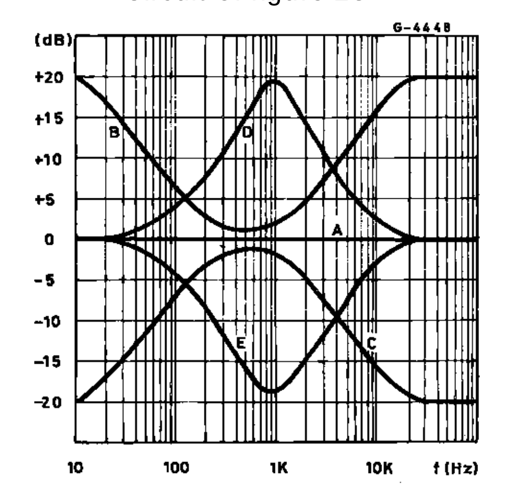


Figure 24 : Frequency Response of the Circuit of figure 23



A : all controls flat

B : bass & treble boost, mid flat

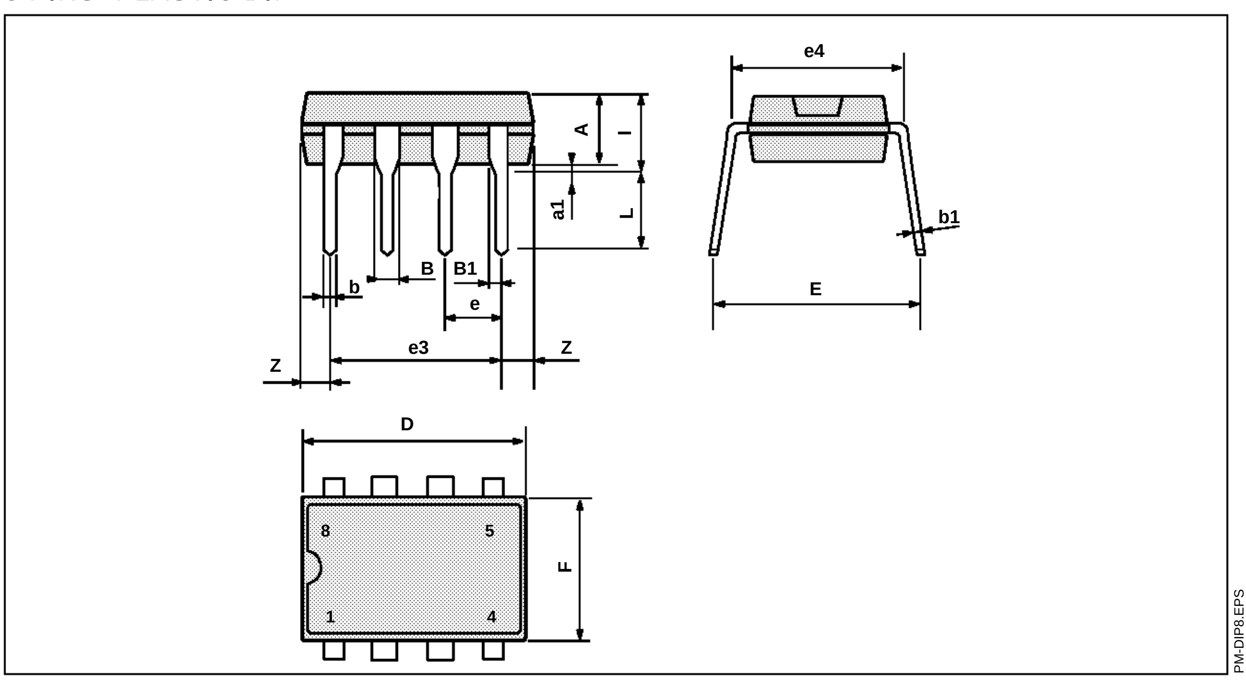
C : bass & treble cut, mid flat

D : mid boost, bass & treble flat

E : mid cut, bass treble flat

PACKAGE MECHANICAL DATA

8 PINS -PLASTIC DIP



Dimensions	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A		3.32			0.131	
a1	0.51			0.020		
B	1.15		1.65	0.045		0.065
b	0.356		0.55	0.014		0.022
b1	0.204		0.304	0.008		0.012
D			10.92			0.430
E	7.95		9.75	0.313		0.384
e		2.54			0.100	
e3		7.62			0.300	
e4		7.62			0.300	
F			6.6			0260
i			5.08			0.200
L	3.18		3.81	0.125		0.150
Z			1.52			0.060

DIP8.TBL